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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/22/2003

In-Hwan Oh

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7776

7590

06/21/2004

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EXAMINER

LAXTON, GARY L

ART UNIT

PAPER NUMBER

2838

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/691,734

Applicant(s)

OH, IN-HWAN

Examiner

Gary L. Laxton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

2. Claims 18 and 19 are objected to because of the following informalities:

Claim 18 recites the limitation "the switching LC resonator" in line 6. There is insufficient antecedent basis for this limitation in the claim. Claim 19 inherits the same. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The examiner does not understand what the applicant means by: "the auxiliary power device is not coupled into the DC link lines." The phrase "not coupled into the DC link lines" is especially confusing. Additionally, the applicant positively claimed, in claim 1, that the

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auxiliary power device is coupled between the DC link lines. This further confuses the claim limitations. Therefore, claim 17 is not given any patentable weight.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 5-9, 11-17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Divan (US 4,730,242).

Divan discloses a converter circuit, comprising: an AC-to-DC converter (S1-S6), comprising a plurality of first power devices (S1-S6); a resonant DC link (figure 7), comprising at least one auxiliary power device (113); a DC-to-AC converter (S7-S12), comprising a plurality of second power devices (S7-S12); and DC link lines (85, 86), coupling the AC-to-DC converter, the resonant link, and the DC-to-AC converter, wherein the auxiliary power device (bipolar 113 and diode S) is coupled between the DC link lines. The transistors are bipolar with diodes in parallel. The power devices are coupled pair-wise. The AC-to-DC converter comprises at least one of three first arms and simple rectifiers, generating an essentially DC voltage. First terminals coupled to corresponding first arms, the first terminals operable to receive AC power from an AC power source

Claim 14; Divan discloses a resonant capacitor (84); a diode (S); and a switch (113); coupled between the DC link lines and parallel with each other.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Divan (US 4,730,242) in view of Lee et al (US 5,633,793).

Claims 4 and 10; Divan discloses the claimed subject matter in regards to claims 3 and 9 supra except for the power diodes being coupled across the power transistors comprises a first power diode being coupled between a source and a drain of a MOSFET first power transistor.

Lee et al teaches that each bridge switch of a converter and rectifiers has an anti-parallel diode associated therewith; and it is understood that these anti-parallel diodes may be either discrete components or the body diode in the case of an active switch such as a MOSFET.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Divan to incorporate power diodes coupled between a source and a drain of a MOSFET in order to utilize the current carrying characteristics of MOSFETs as switching devices.

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9. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Divan (US 4,730,242) in view of Lauw et al (US 5,559,685).

Claims 18 and 19; Divan discloses a resonant capacitor (C), comprising parasitic capacitors of the power devices; an inductance (L) coupled in parallel with the auxiliary power device, the inductance forming a resonant circuit with the resonant capacitor; and a second capacitor (C_f).

However, Divan does not disclose the resonant DC link comprises: a first capacitor coupled in series with the auxiliary power device.

Lauw et al teaches coupling a switch (S_{C1}) in series with a first capacitor (C_C), in parallel with an inductor (L_R) in parallel with a resonant capacitor (C_R) in order to clamp the link voltage to maximum voltage during non-zero segments of each link voltage pulse.


Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the resonant DC link of Divan to include a first capacitor in series with the auxiliary switch as taught by Lauw et al and to couple the inductor in parallel with the auxiliary switch and first capacitor and have a second capacitor in series with the resonant circuit in order to clamp the link voltage to maximum voltage during non-zero segments of each link voltage pulse as taught by Lauw et al.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L. Laxton whose telephone number is (571) 272-2079. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (571) 272-2084. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Gary L. Laxton
Patent Examiner
Art Unit 2838

GLL